

# Novel Micro-Capillary Electrochromatography for Mars Organic Detector, Phase II

Completed Technology Project (2009 - 2012)



## Project Introduction

Los Gatos Research proposes to develop a powerful new technology - next generation Micro-Capillary Electrochromatography - a high performance and low power consumption microfluidic sample separation device suitable for separating organic molecules as signatures as past and present life on Mars. In this Phase II effort, we will refine this enabling new microfluidic technology that we have successfully demonstrated in Phase I in order to integrate with NASA Mars Organic Detector.

## Anticipated Benefits

The proposed micro-CEC technology has great potential to complement NASA's current efforts to find signature of life on Mars such as Urey Mars Organic Analyzer and Mars Organic Detector. The proposed technology has broad applications including on-chip biosensors, electrochemical sensors, wet-chemistry systems, as well as high pressure micropumps for fluid positioning, mixing, metering, storage, and filtering systems. In addition, our novel technology is naturally suited to such applications as planetary and small body surface chemistry studies, clinical diagnostics, spacecraft and biosphere environmental monitoring, and toxicology studies. Finally, the novel micro-CEC technology will also benefit NASA's other "Micro Laboratories" programs such as monitoring Space Station environment and in-situ explorations of Europa and Titan. The next generation micro-CEC technology described in this proposal possesses a myriad of potential commercial technologies and applications in markets ranging from specialty medical and aerospace industries to consumer electronics. The primary commercial products based on such CEC technology are components for DNA, protein and drug separation and analysis, biological and chemical analysis systems, and drug delivery systems in pharmaceutical and biotechnology industries. In addition, the EOF based technology is also well suited for MEMS actuator systems and embedded health monitoring systems. Our proprietary technology vastly improves robustness and reliability, thus clearing one of the last hurdles of a wider acceptance of CEC in the biotechnology and pharmaceutical industries



Novel Micro-Capillary  
Electrochromatography for Mars  
Organic Detector, Phase II

## Table of Contents

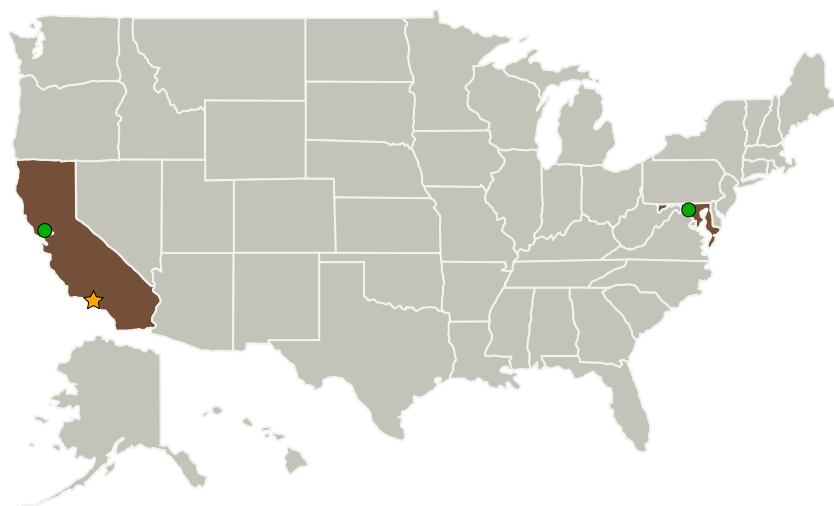
Project Introduction	1
Anticipated Benefits	1
Primary U.S. Work Locations and Key Partners	2
Organizational Responsibility	2
Project Management	2
Project Transitions	3
Technology Maturity (TRL)	3
Technology Areas	3

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## Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory (JPL)	Lead Organization	NASA Center	Pasadena, California
● Ames Research Center (ARC)	Supporting Organization	NASA Center	Moffett Field, California
● Goddard Space Flight Center (GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland
Los Gatos Research	Supporting Organization	Industry	Mountain View, California

## Primary U.S. Work Locations

California	Maryland
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## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

### Program Director:

Jason L Kessler

### Program Manager:

Carlos Torrez

### Project Manager:

Gary C Jahns

### Principal Investigator:

Hong Jiao

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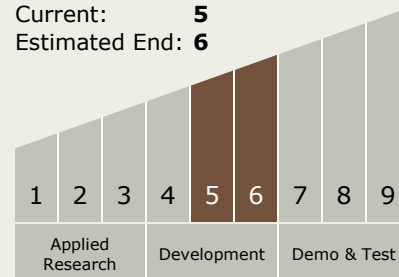
## Project Transitions

 **March 2009:** Project Start

 **March 2012:** Closed out

## Technology Maturity (TRL)

Start: **5**  
Current: **5**  
Estimated End: **6**



## Technology Areas

### Primary:

- TX07 Exploration Destination Systems
  - └ TX07.1 In-Situ Resource Utilization
    - └ TX07.1.3 Resource Processing for Production of Mission Consumables